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**Fixed Income Portfolio Management
in Indian Banks**

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"A creditor refusing to receive the payment of his debt shall pay a fine of 12 *panas*."

Kautilya

FIXED INCOME PORTFOLIO MANAGEMENT IN INDIAN BANKS

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A version of this article is published as Chapter 1 of the book *Handbook of Fixed Income Securities Volume II: Monographs on Term Structure*, ISBN-13: 978-3639352634.

Background

Investment is one of the businesses a bank can engage in as per the Banking Regulation Act 1949; a bank can accept, for the purpose of lending or investment, deposits of money from the public, repayable on demand or otherwise, and withdrawal by cheque, draft, order or otherwise. Generating income from investment in fixed income securities is one of the prime drivers of the income streams of banks. But a quick review of the developments in the fixed income securities market would reveal that the phase of falling interest rates prevailing between 2001 and 2004 witnessed mounting investments by banks on debt securities. In sharp contrast, during the phase of rising rate of interest post mid 2004, the G-sec market experienced a period of virtual collapse and Indian banks suffered from huge mark-to-market losses as happened during first and second quarter of 2008-99.

Hence the officers handling fixed income securities should be familiar with requisite tools & techniques to effectively play in the fixed income market. They have to know what are various determinants of market prices of G-Secs, how to analyze the G-sec yield curve and its various shapes, how to value G-Secs, which security to buy and

which one to sell, what kind of portfolio strategy to formulate, what alternative types of returns these securities generate, what kinds of risks they pose and how to measure such risks.

This is imperative against a backdrop of the national scenario where the number of players in the market is rising as a result of economic reform and the spread enjoyed by the players is becoming thinner. So each dealer should learn how to read every nuance of working of this market and its instruments.

Types of Fixed Income Securities

Fixed income securities mean debt market securities. These are issued by Central and State Governments and the private sector. Central government securities are of two types – T-bills, i.e. zero coupon and coupon paying bonds like central government stocks. T-bills are issued for 91 days, 182 days and 364 days. These are akin to fixed deposits. You buy a T-bill at less than face value and on maturity receive the face value. The difference is the return. Coupon paying bonds have maturities ranging from 2 to 30 years with different coupons.

Coupon paying bonds are more risky than zero coupon bonds because of greater number of cash flows and consequent greater number of potential defaults as well as longer period of locking in of money.

Example of a zero coupon bond is 364 days T-bill of maturity date 16 January 2009 (see the trade data table at <http://www.ccilindia.com/GsecStatistics.aspx>). This means if we buy it on 24 April 2008 the maturity period is 8 months and 22 days. Example of a coupon bond is CG2017, i.e. coupon rate 7.99% and maturity date 9 July 2017. This means if we buy it on 24 April 2008 the maturity period is 9 years 2 months and 15 days.

Since coupons are obligatory payments against the loans taken by the issuer of the security, these are called fixed income securities. There is a fear of default risk in any kind of lending. But government securities are safer than the private corporate securities. So banks hold government securities. Henceforth we shall be using the word “bond” to connote a fixed income debt security.

In India all information regarding trading and yields of government securities are compiled and maintained by Clearing Corporation of India (CCIL). It is the central counterparty in all transactions in electronic forms and in charge of settlement.

Why to maintain a portfolio of fixed income securities?

In financial planning a great importance is attached to planning how to maintain fixed income portfolio, i.e. bond portfolio because income from bonds are less risky than their equity counterparts. Banks find more interest in G-secs than loans since the former are default-free. Bond portfolio is a reservoir of liquidity. Following is an example of what can happen to a bank because of dearth of liquidity: A local football club was selling tickets at a very high price; being weekend that time everybody rushed to ATM and the bank collapsed since the Central Bank could be contacted on weekend. Investment in bond portfolio can be planned in a manner such as to synchronize cash inflow therefrom with scheduled cash outflows like disbursement of mature TDs (term deposits). The Indian banks can invest the (foreign exchange) forex deposits in short term (ST) T-bills and meet sudden

demand for forex. Insurance companies invest in long term bonds such as to match the mature policy disbursements with the interest receipts. Their motive is ALM not profit maximization. In India, banks hold fixed income securities in trading book for profit-booking purpose and in non-trading book for yield earning purpose.

Concepts

1. A bond is defined as a debt investment in which an investor lends money to an entity (corporate or governmental) that borrows the funds for a defined period of time at a fixed or floating interest rate.

2. Bonds are used by corporates, municipalities and governments to finance a variety of projects and activities.

3. Interest on the bonds is usually paid every six months (semi-annually) in most of the countries, except Eurobonds. A bond which pays once in its life time and at maturity is called zero coupon bond or simply 'zero', e.g. T-bill. It is a good source of capital. There are instances that when a commercial bank was bailed out by central/federal government through infusion of capital the latter

bought zeroes from the former which the former disbursed on maturity by the time it became self sustaining.

4. A bond is commonly referred to as a fixed-income security or 'fixed income'.

5. A bond is called a long if held on asset side and a short if held on liability side.

6. The price of a bond is the sum of the present values, i.e. the price the buyer is presently willing to pay, of the expected cash flows.

7. The interest rate used to compute the present value of an expected cash flow is called the yield or discount rate.

8. The required yield of a bond depends on comparable securities in the market, e.g. yield of a zero coupon bond may compare with the yield of a fixed deposit.

9. If a bond is held till maturity after purchase or settlement the yield of that bond called is it's yield to maturity (ytm).

10. ytm is sometimes called 'rate of return' or simple 'return' on the bond, The required yield for a semiannual bond is one half of the selected annual rate of interest with which to discount the cash flows.

11. Normally each cash flow is discounted by the same yield.

12. If each cash flow is looked upon as a zero coupon bond with a maturity equal to the time interval between settlement and receipt of that cash flow a coupon bond can be viewed as a portfolio of zero coupon bonds.

13. In the above case each cash flow of the coupon bond is discounted by the spot rate on the appropriate zero coupon rate.

14. A bond is called noncallable when the issuer, with an intention to save interest expenses, cannot ask the investor to submit the bond for redemption when the interest rate in the market plummets.

15. A bond is called nonputable when the investor, with an intention to earn more interest, cannot ask the issuer to redeem the bond when the interest rate in the market hikes.

16. Higher the possibility of default, the lower the credit rating of the bond and the higher the return is expected by the investor.

17. There are two kinds of values of a security: present value and market value.

18. Valuation means calculating the present value for the purpose of comparing with the market value.

19. Market value may be above or below present value.

20. Valuation is concerned with non-traded bonds, for traded bonds market price is taken as the value. In India out of 105 bonds around 15 bonds are traded on a particular trade-day. Their prices are available in FIMMDA and CCIL www.fimmda.org,

www.ccilindia.com,). In India bonds below investment grade can not be traded.

21. If a bond is bought between two coupon periods there are two prices:

a. Full or dirty price: The price calculated in usual present value method is called full or dirty price and it includes the accrued interest due to the seller.

b. Flat or clean price: It is defined as the full price minus the accrued interest and it is not discounted, since it belongs to the past.

22. Bond portfolio is a part of investment portfolio which consists of bonds, T-bills, debentures, shares, mutual funds, commercial papers, forex and mortgaged backed securities.

23. As per RBI's Master Circular dated 2 July 2007 investment portfolio is classified as

- i. Accounting Categories,
- ii. SLR and non SLR Categories and
- iii. Valuation Categories.

- i. Accounting category

- a. government securities
- b. other approved securities
- c. debentures and corporate bonds

- ii. SLR (statutory liquidity ratio) and Non-SLR categories

- a. SLR category

GOI (Government of India) securities at 25% NDTL (net demand and time liabilities)

- b. Non SLR category

PSU (public sector units), corporate bonds, debentures, shares, CPs (commercial papers) etc.

- iii. Valuation Categories

- a. HTM – maximum 25% of NDTL, not MTM, classification at purchase or transfer from other categories maximum once a year

b. AFS - MTM at minimum 90 days interval, classification at purchase or transfer from other categories. AFS category is like a vacation in the sense that the bank gets respite here from MTM or P/L for 2 more months.

c. HFT – MTM at least every month

The issues

Valuation and Return

Valuation and return of a coupon paying bond

Valuation of zero coupon bond is akin to valuation of a fixed deposit (FD). Suppose you buy 364 T-bill of face value 100 at price 93.

This means you fix today 93 to grow into 100 after one year. What is the rate of interest or yield you earned?

Suppose the yield you earned is r .

This means $93(1+r) = 100$

Or $1 + r = (100/93) = 1.075$

Or $r = 0.075 = 7.5\%$

Now suppose you can earn 9.5% on one year (certificate of deposit) CD in another place. Why should you invest in the T-bill if you want to earn profit while my other considerations like liquidity are taken care of?

A PSB offers now 8.25% on 1-year CD. For an CD of 100 you have to fix $100/(1+8.25\%) = 92.38$. This is lower than 93. So you will not buy T-bill. Note here we are dividing 100 by the factor $(1+8.25\%)$. This kind of dividing is called 'discounting' in stark contrast with multiplying by the same, i.e. 'compounding'; 'discounting' is the antonym of 'compounding'.

This comparison is only for the sake of understanding valuation of zero coupon bonds.

A bank often buys T-bills irrespective of yield because of many other factors like liquidity and SLR requirement.

A bond means a series of cash flow. Consider a 2 year bond of face value 100 and 10% coupon. This means after 1 year you will get 10

and after 2 year you will get 110. How much are you today willing to pay for such bond?

The first coupon can be compared with a 1-year T-bill. Suppose today 1-year T-bill earns 8.25% public sector bank.

This means how much money you should fix to grow to 10 after 1 year. If x is the amount of the money, $x*(1+8.25\%) = 10$

$$\text{i.e. } x = 10/1.0825 = 9.24$$

Again today, suppose a 2-year certificate of deposit earns 8.75%. If y is the amount to be fix at the rate of 8.75% p.a. for 2 years $y*(1 + 8.75\%)^2 = 110$ or $y = 110/(1.0875)^2 = 91.32$

$$\text{Total amount to be fixed } 91.32 + 9.24 = 100.56$$

This is the price you want to pay for the bond. This is also called fair price.

Why is the fair price more than the face value?

Because the bond pays interest at 10% every year while the market yield is lower.

Now how much rate you earned on the bond as a whole?

If you forget the first year coupon you are earning $(110 - 100.56)/100.56 = 9.3\%$

Suppose you decided to lock in your money 100.56 for two years.

The first year coupon 10 you invest at 1 year rate and get $10 \times (1 + 8.25\%) = 10.825$ in the end of 2nd year. In the end of 2nd year you get total $10.825 + 110 = 120.825$. You earned $= (120.825 - 100.56)/100.56 = 20.15\%$

Sensitivity

From the previous discussion we understood that we value a bond with the help of market yield or yield on a security of similar nature.

For example if a 2 year bond is offering 10% coupon while an instrument of similar tenor is offering more than 10%, say 11%, you will be willing to pay a less value, hence price of the bond will fall.

This is called sensitivity of bond price.

If the market yield rises too much you will have fear of loss of value of your investment and you would like to sell this investment. Everybody like you would do the same. Price of the bond would fall fast. But when the rise in the market yield is too high, you may expect it to fall as it happens in a cycle, people like you may for the time being slower the pace of selling the bond, hence the pace of fall in price of the bond may be slackened.

This aspect of bond sensitivity, where fall in price is less than expected is known as convexity. This can be the case when the bond issuer is a top rated borrower or the bond is protected from any default risk. Similarly if the market yield falls, it can be shown that the bond price rises more than expected. Convexity is desired property of a bond.

In India the measure of sensitivity, as permitted by the Reserve Bank of India (RBI) is modified duration (MD) is calculated for trading book. Since a security held in trading book has to be sold by regulatory compulsion within 91 days, banks try to reduce it and hence do not

trade for long term securities. The longest tenor of securities purchased by banks is coming down overtime.

Whether to hold or trade

A bank should try to make accurate forecast of market interest rate. If the bank takes a view that market rate would rise it should sell the bonds which are relatively less convex and hold those which are relatively more convex in a situation when the economy is stable. But if the economy is in downturn or depression, one should think before selling a top rated bond, since it gives a steady stream of cash flow while assets like forex, commodity and equity might not.

Types of portfolio

From trading view point there are two types of bond portfolios – bullet portfolio and barbell portfolio. Bullet means ‘one-time shot or one time payment’. A bullet portfolio means zero coupon bond portfolio. A barbell portfolio means a mix of zero coupon and coupon paying bond portfolio. If one is risk averse and does not believe in high return bullet portfolio is preferable.

If one likes to take risk in order to earn higher profit - taking the advantage of interest rate fluctuation - one should maintain barbell portfolio. 'Barbell' means balance in the middle. A barbell portfolio contains coupon paying bond also and hence more risky than bullet portfolio. If the interest rate forecast is wrong one may fall in trouble. Suppose you have taken a view that interest rate would fall tomorrow and you would make profit such as to disburse a floating rate liability maturing tomorrow. But it may happen that next day interest rate rose. Wherefrom to get money? Here zero coupon bonds come to use, they work as the balancing factor. Therefore a portfolio containing both zero and non-zero coupon bonds is called barbell portfolio.

Asset liability management (ALM) perspective

Investments in bonds are on asset side indicating cash inflow while liabilities indicate cash outflow. Bond investments should be planned in a manner to synchronize with cash outflow. We can take an example of an individual who invests in RBI bond the coupon payments from which coincides with his insurance premium payments.

The convexity property can be applied to other instruments like loans also. The average convexity of asset portfolio should be more than the average convexity of liability portfolio. In such a case the potential loss in net worth out of interest rate fluctuations would be the minimum.

How to measure maximum probable losses?

The final issue is what is the amount beyond which there could be hardly any further loss if we want to be sure to the extent of, say, 95%. This concept is known as Value at Risk (VaR) concept. For a risk manager, the point of concern is maximum possible loss. As per the VaR method each maximum possible loss amount is predicted with certain probability, e.g. there is 90% probability that maximum loss could be 1 crore or there is 99% probability that maximum loss could be 3 crores. Accordingly capital is provided for or the hedging techniques like entering appropriate derivative contracts are used.

Summary

In India banks hold fixed income securities in held to maturity portfolio for fulfilling the statutory liquidity ratio (SLR) requirement of the Reserve Bank of India. Apart from SLR, they also hold the same in non-SLR portfolio mainly because of non-risky character. Again, government securities can also be used in dealing with Indian money market products like repo, reverse repo, market repo and CBLO (collateralised borrowing & lending obligation). Further, stable cash flows from government securities also enable the banks to enter forward rate agreements and interest rate swaps in order to solve the problem of illiquidity and low coupon rate. In India, the market risk measure of fixed income securities is modified duration using the benchmark rates like 10-year maturity central government security for rate shocks prescribed by the regulator. The banks are asked to calculate any other measure of risk like value at risk used in developed market economies. For state government bonds and corporate bonds one needs to add 25 and 50 basis points respectively to the benchmark rate for calculating price and modified duration. In day to day fixed income operations Indian banks follow their respective internal Investment Policy framed based on RBI guidelines. The lay out, contents and importance of such policy varies

from bank to bank. The reader should go through the notifications in the RBI portal.

Above discussion shows that fixed income management activity revolves around the yields of fixed income securities. So this book contains two monographs on the yield curve.

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